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# A Survey on the Knowledge of Medicine-related English Vocabulary of Japanese Medical and Nursing Students

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**ABSTRACT:**

This study investigated the knowledge of basic medicine-related English vocabulary of medical and nursing students. One hundred and thirty-four first-year and 86 second-year medical students and 169 first-year and 90 second-year nursing students participated in the study. Forty-one first-year education and 37 first-year technology university students also participated in the study for comparison. The students were asked to translate 10 English medicine-related words into Japanese and write down the English equivalents for 10 Japanese medicine-related words. The overall average scores of the first-year medical and nursing students' scores were only 18.34 points out of the full scores of 40 points and those for the second year were 20.44 points. In order to see how many chances to learn the basic English medical terms the students had had before entering the universities, this study also investigated how many medicine-related English terms Japanese high school textbooks carry. It was found that only 9 out of 20 words used in this study appear in the textbooks. The students' low scores on the tests can partly be attributed to the English education at high school. However, the medical group that had used some medical English textbooks at college achieved 27.21 in contrast with 23.57 for those who had no such instruction; with nursing students, the similar contrast was 19.62 vs. 12.89. This indicates the necessity and the prospect of English education on basic and common medicine-related terms and expressions at medical universities before the specialized medical and nursing education starts.

**Key Words**: medical English, vocabulary, testing, word frequency, textbook

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# INTRODUCTION

In today's internationalized society, where doctors and nurses have more chances to work with patients from abroad or to engage themselves in working abroad, it is of much importance for them to have knowledge of medicine-related vocabulary in English, a language which serves as the commonest medium of communication. When a foreign patient who cannot speak Japanese comes to a hospital in Japan, for example, doctors and nurses must use English to assess the patient's health problems by asking questions for personal and clinical histories, explain the tests they are going to run, give directions to the patient, and inform him/her of the diagnosis and the treatments to follow. If the patient is hospitalized, nurses must communicate with him/her in English to make him/her more comfortable in the hospital. Consequently, it is indispensable for doctors and nurses to have knowledge of basic medical English terms such as parts of the body, symptoms and abnormalities, names of diseases, names of tests, treatments, and medication. Medical and nursing students are no exception; as doctors and nurses in the making, it is essential for them to study these medical terms in English.

Our questions in this study are (1) how much knowledge of medically-related English vocabulary the medical and nursing students have, (2) how much chance of learning the English medicine-related terms the medical and nursing students have before they enter universities. In this study, the second question is replaced with the following question (2') how many medicine-related English terms American and Japanese school textbooks carry.

The knowledge of English vocabulary in this study is measured by the extent to which the students can give the appropriate Japanese meaning for the medical English words presented and the correctly spelt English words for the Japanese. According to Paribakht & Wesche (1993), the students have only reached Stage 3 out of 5 on the Vocabulary Knowledge Scale, while Schmitt (1997) designates this stage as a limited aspect of vocabulary acquisition. We, however, believe that our test, within its own limitation, can roughly quantify and indicate the Japanese students' knowledge level of medical English vocabulary.

# METHOD

### Participants

The participants were 85 first-year and 86 second-year medical students and 60 first-year and 58 second-year nursing students from Fukui Medical University (FMUM1, FMUM2*, FMUN1, and FMUN2*, respectively), 49 first-year medical students and 56 first-year and 32 second-year nursing students from Hamamatsu University School of Medicine (HUM1, HUN1, and HUN2*, respectively), 53 first-year nursing students from Fukui Prefectural University (FPUN1*), and 41 first-

year education and 37 first-year technology students from a national university (E1 and T1 respectively). The education and technology students participated in this study for comparison. The asterisks (*) above show that those classes had used some kind of medical English textbooks for at least 2 months before this experiment.

### Target Words

The target words are 10 English and 10 Japanese medicine-related words such as body parts, diseases, symptoms, and treatments. The words were selected according to their high likelihood that the participants would be exposed to the words when they talk or read about health in their daily life. The words frequently appear in textbooks used in schools in America. According to Zeno, et al.(1995), 19 of the 20 words are in the SFI (Standard Frequency Index) range between 60.0 and 40.1 of the Word Frequency Guide[1]. This means they are in the highest 13 percent of the total 154,941 words in the WFG Corpus in terms of their frequency of appearance in American school textbooks. (Table 1 )

**Table 1** : Nunber, Percent, Cumulative Percent of Word-Types in Various SFI Ranges

| SFI Range | Number of Word types | Percent | Cumulative Percent | Target Words |
|---|---|---|---|---|
| 60.1-above | 925 | .6 | .6 | |
| 50.1-60.0 | 4,729 | 3.1 | 3.7 | cancer, chin, fever, nerve, operation, patient, physician, throat |
| 45.1-50.0 | 5,445 | 3.5 | 7.2 | ankle, cough, fatigue, scar, toe, lung |
| 40.1-45.0 | 8,829 | 5.7 | 12.9 | bandage, bleed, injure, tablet |
| 35.1-40.0 | 13,147 | 8.5 | 21.3 | stomachache |
| 30.1-35.0 | 19,284 | 12.4 | 33.8 | |
| 25.1-30.0 | 30,895 | 19.9 | 53.7 | |
| 25.0-below | 71,687 | 46.3 | 100.0 | |
| Total | 154,941 | | | |

SFI : Standard Frequency Index

### Procedure

Test 1 was an English-Japanese translation test, and Test 2 was a Japanese-English translation test. In Test 1, students were asked to write down the Japanese meanings of the 10 English target words. The students were directed to write only medicine-related meanings. In Test 2, they were asked to write down the English equivalents for the 10 Japanese words. For both tests together, the students were given 10 minutes.

# RESULTS

For data analysis, a 2-point scoring system was employed for each target word. In Test 1, we selected two or three Japanese meanings as correct answers for each target word. Two points were given for the fully correct answers. One point was given to the incomplete answers such as 'darusa', 'tsukareru' for 'hiro (=fatigue)', 'binetsu ga aru' for 'netsu (=fever)', 'kizu' for 'kizuato (=scar)', and 'gan-yaku (=pill)' for 'jozai (=tablet)'. In Test 2, correctly spelled words were given 2 points, and only 1 point was given to the answers where the spelling was phonologically correct but some vowels or consonants were replaced by similar-sounding but erroneous items. One point was also given to derivatives of the target words (e.g. 'injure' for 'injury' and 'operate' for 'operation').

The mean scores of all the first-year students for each word are shown in Table 2.

The mean total scores of FMUM1 and HUM1 were 23.98 (59.9 %) and 23.16 (57.9%) respectively (full score = 40.0). The mean total scores of FMUM2* was 27.53 (68.8%). The mean total scores of FMUN1 and HUN1 were 13.2 (33.0%) and 12.57 (31.4%) respectively. The mean total score of FPUN1*, FMUN2*, and HUN2* were 18.81 (47.0%), 18.34 (45.9%), and 21.75 (54.4%) respectively. The mean total score of E1 and T1 were 9.73 (24.3%) and 7.92 (19.8%) respectively.

**Table 2** : Average Scores of the Medicine-related Vocabulary Test

Test 1 (English into Japanese)

| | # | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | Subtotal | (%) S.D. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Target Words | n. | ankle | chin | cough | fatigue | fever | liver | physi-cian | scar | tablet | toe | | |
| FMUMI | 85 | 0.61 | 1.36 | 1.84 | 0.92 | 1.94 | 0.96 | 1.21 | 0.13 | 1.41 | 1.74 | 12.13 | (60.6) 3.61 |
| HUMI | 49 | 0.98 | 1.39 | 1.8 | 1.06 | 1.78 | 1.14 | 1.1 | 0.22 | 1.55 | 1.73 | 12.76 | (63.8) 3.71 |
| FMUNI | 60 | 0.33 | 0.57 | 1.57 | 0.07 | 1.77 | 0.03 | 0.23 | 0 | 1.03 | 0.62 | 6.22 | (31.1) 2.85 |
| HUNI | 56 | 0.5 | 0.29 | 0.89 | 0.21 | 1.5 | 0.25 | 0.32 | 0.05 | 0.75 | 0.93 | 5.7 | (28.5) 3.79 |
| FPUNI* | 53 | 1.47 | 0.38 | 1.58 | 0.57 | 1.89 | 0.94 | 0.23 | 0 | 1.81 | 1.77 | 10.64 | (53.2) 2.82 |
| E1 | 41 | 0.83 | 0.49 | 0.63 | 0.2 | 0.93 | 0.44 | 0.49 | 0 | 0.54 | 0.98 | 5.51 | (27.6) 3.50 |
| T1 | 37 | 0.27 | 0.76 | 0.38 | 0.16 | 0.97 | 0.54 | 0 | 0 | 0.43 | 0.81 | 4.32 | (21.6) 3.30 |
| M1 | 134 | 0.8 | 1.38 | 1.82 | 0.99 | 1.86 | 1.05 | 1.16 | 0.18 | 1.48 | 1.74 | 12.44 | (62.2) |
| N1 | 169 | 0.77 | 0.41 | 1.35 | 0.28 | 1.72 | 0.41 | 0.26 | 0.02 | 1.2 | 1.11 | 7.52 | (37.6) |
| MIN1 | | 0.78 | 0.8 | 1.54 | 0.57 | 1.77 | 0.67 | 0.62 | 0.08 | 1.31 | 1.36 | 9.49 | (47.5) |

Test 2 (Japanese into English)

| # | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | Subtotal | (%) S.D. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Target Words | cancer | patient | injury | opera-tion | bleed | nerve | throat | lung | stomach-ache | band-age | | |
| FMUMI | 1.86 | 1.79 | 1.09 | 1.84 | 0.54 | 0.85 | 1.01 | 1.55 | 0.99 | 0.33 | 11.85 | (59.2)3.28 |
| HUMI | 1.78 | 1.78 | 0.9 | 1.78 | 0.57 | 0.55 | 0.92 | 0.92 | 1.12 | 0.1 | 10.41 | (52.0)3.02 |
| FMUNI | 1.88 | 1.32 | 0.55 | 1.13 | 0 | 0.43 | 0.05 | 1.12 | 0.48 | 0.02 | 6.98 | (34.9)2.22 |
| HUNI | 1.23 | 1.59 | 0.46 | 1.43 | 0.07 | 0.59 | 0.36 | 0.43 | 0.71 | 0 | 6.88 | (34.4)3.51 |
| FPUNI* | 1.47 | 1.47 | 0.26 | 1.6 | 0.47 | 0.98 | 0.32 | 0.89 | 0.7 | 0 | 8.17 | (40.8)3.84 |
| E1 | 1.15 | 0.61 | 0.2 | 1.1 | 0.15 | 0.2 | 0.12 | 0.15 | 0.54 | 0.02 | 4.22 | (21.1)2.99 |
| T1 | 1.05 | 0.32 | 0.27 | 1.11 | 0.08 | 0.19 | 0 | 0.16 | 0.38 | 0.03 | 3.59 | (18.0)2.60 |
| M1 | 1.82 | 1.78 | 1 | 1.81 | 0.56 | 0.7 | 0.97 | 1.24 | 1.06 | 0.22 | 11.13 | (56.5) |
| N1 | 1.53 | 1.46 | 0.43 | 1.39 | 0.18 | 0.67 | 0.24 | 0.81 | 0.63 | 0.01 | 7.34 | (36.7) |
| MIN1 | 1.64 | 1.59 | 0.65 | 1.56 | 0.33 | 0.68 | 0.53 | 0.98 | 0.8 | 0.09 | 8.86 | (44.3) |

Test 1 and 2

| | n. | Mean | Total(%) | S.D. | | |
|---|---|---|---|---|---|---|
| FMUM1 | 85 | 23.98 | (59.9) | 5.95 | Mean of M1 23.57 (58.9) | |
| HUM1 | 49 | 23.16 | (57.9) | 5.57 | | Mean of MIN1 18.34 (45.9) |
| FMUN1 | 60 | 23.16 | (33.0) | 4.06 | Mean of N1 14.86 (37.2) | |
| HUN1 | 56 | 12.57 | (31.4) | 6.22 | | |
| FPUN1* | 53 | 18.81 | (47.0) | 6.07 | | |
| FMUM2* | 86 | 27.53 | (68.8) | 6.82 | | |
| FMUN2* | 58 | 18.34 | (45.9) | 5.47 | | |
| HUN2* | 32 | 21.75 | (54.4) | | | |
| E1 | 41 | 9.73 | (24.3) | 5.87 | | |
| T1 | 37 | 7.92 | (19.8) | 5.18 | | |

* = Those classes had used some kind of medical English textbooks for at least 2 months before this experiment.

## DISCUSSION

Our first question in this study is how much knowledge of medicine-related English vocabulary the medical and nursing students have. First and the most notable of all, it can safely be generalized that the students' knowledge of medicine-related English vocabulary is unexpectedly low.

The average total score of all the first-year medical and nursing students was 9.49 points (47.5 %) out of the full score of 20 points for Test 1, and 8.86 points (44.3%) out of 20 points for Test 2.

For Test 1, the mean score of the word 'scar' by all the first-year medical and nursing students was the lowest (.08 out of 2.0) among the ten target words. The mean scores for the words 'fatigue'(.57), 'physician'(.62), 'liver'(.67), 'ankle'(.78), 'chin'(.80) were below 1.0 (full score = 2.0).

For Test 2, the mean score of the word 'bandage' was the lowest(.09 out of 2.0)among the ten target words. The mean scores for the words, 'bleed'(.33), 'throat'(.53), 'injury'(.65), 'nerve'(.68), 'stomachache'(.80), 'lung'(.98) were below 1.0 (full score = 2.0).

The target words are all very basic and common words which are indispensable when we talk about our health conditions in daily life. These terms are so basic that it was assumed that most people would know them in their native languages, and in fact the target words were among the highest 13% of the 154,941 words in the WFG Corpus in terms of the frequency of appearance in school textbooks used in America (See Table 2 ). However, our subjects, new comers to the medical faculties, did not know such basic terms in English as stated in the Result section. It is questionable whether they have chances to be exposed to those words in English before they entered the universities. In order to solve our second question, we investigated to see if the target words appear in English textbooks used in junior and senior high schools in Japan. The textbooks which we examined were *New Horizon 1,2, and 3* (Tokyo shoseki) as junior high school textbooks, *New Horizon I and II* (Tokyo shoseki) and *Genius I and II* (Taishukan) as senior high school textbooks. *New Horizon* is used for English classes for the first, second, and third year students in all junior high schools, and *New Horizon* and *Genius* are used for 'English I and II', the required courses in many senior high schools in Fukui Prefecture. We not only checked the index of the textbooks but checked through the pages to see if the target words were used.

Surprisingly enough, more than half of the target words never appear in any of the above textbooks (See Table 3). The words such as 'chin', 'cough', 'fatigue', 'liver', 'physician', 'scar', 'tablet', 'toe', 'patient', 'operation', and 'lung' did not appear in any of the above textbooks. The words 'ankle', 'bleed', 'throat', and 'bandage' only appear in one of the two senior high school textbooks but not both. It suggests that students have no way of knowing these terms in English while they are studying in junior high or in high schools in Japan.

**Table 3** : Standard Frequency Index and Appearance in the Japanese H.S.English Textbooks of the Target Words

(○=appearing ×=not appearing)

| Target Words | SFI | New Horizon 1~3 | New Horizon I,II | Genius I,II |
|---|---|---|---|---|
| 1 ankle | 47.2 | × | ○ | × |
| 2 chin | 53.2 | × | × | × |
| 3 cough | 48.2 | × | × | × |
| 4 fatigue | 47.5 | × | × | × |
| 5 fever | 53.5 | × | ○ | ○ |
| 6 liver | 50.9 | × | × | × |
| 7 physician | 50.8 | × | × | × |
| 8 scar | 46.0 | × | × | × |
| 9 tablet | 44.6 | × | × | × |
| 10 toe | 50.3 | × | × | × |
| 11 cancer | 53.5 | × | ○ | ○ |
| 12 patient | 55.1 | × | × | × |
| 13 injury | 44.4 | ○ | × | × |
| 14 operation | 56.6 | × | × | × |
| 15 bleed | 43.1 | × | × | ○ |
| 16 nerve | 53.8 | × | ○ | ○ |
| 17 throat | 55.5 | × | ○ | × |
| 18 lung | 48.3 | × | × | × |
| 19 stomachache | 36.5 | × | ○ | ○ |
| 20 bandage | 44.9 | × | × | ○ |
| | | (for JHS) | (for SHS) | (for SHS) |

We further investigated how much medicine-related English vocabulary, other than the 20 target words, are carried in the above Japanese junior and senior high school English textbooks. As samples, we picked out basic medicine-related words from *Medical Terms and Expressions Everybody Uses* (Fujieda, Tamamaki, Mann 1998), which are listed in Chapters 1 (Body Parts), 2 (Body Functions), 3 (Symptoms and Abnormalities), and 4 (Diseases and Wounds) 5 (Medical Equipment), 6 (Medical Procedures), and 7 (Hospital) and checked how many of the sample words appear in the textbooks. (See Appendix)

It was found that only 36 words, 31.8 percent of the basic words for Body Parts appear in any of the textbooks and much less names of symptoms, abnormalities, and diseases. It is no wonder that the participants in this study did poorly in our vocabulary test. Therefore it is essential for medical and nursing English teachers to be conscious of this serious problem and help new medical and nursing students build up their basic medical English vocabulary before they begin to study specialized medical terminology.

If they are taught, students will surely respond to the instruction. In fact, our data indicates the effect of university English education on the students' vocabulary acquisition. As stated in the Participants section, some groups (indicated with *) had studied medicine-related materials in class as follows.

FMUM2* : *Letters to a Young Doctor* by Richard Selzer
FMUN2* : *Intensive Care* by Echo Heron
HUN2* : *Kiso Iryo Eigo – Gakusei no tame no medikaru Ingrisshu* (Igaku shoin)
FPUN1* : *Health Care Today* (Asahi Press)

To make a clear comparison, the participants were classified into two groups, the group with medical materials (M+ or N+) and the one without medical materials (M- or N-) and the group mean scores were as follows:

(M+) Medical students studying medical materials: FMUM2* ... 27.53 (68.8%)
(M−) Medical students not studying medical materials: FMUM1,HUM1...23.57 (58.9%)

(N+) Nursing students studying medical materials: FMUN2*, HUN2*, FPUN1*...19.62 (49.1%)
(N−) Nursing students not studying medical materials: FMUN1, HUN1... 12.89 (32.2%)

The mean scores of both M+ and N+ who have studied medicine-related materials in class were higher than M- and N- who haven't studied medicine-related materials by 3.96 and 6.73 points, respectively. This shows that teaching medicine-related materials even for less than a half year had effect on the vocabulary level of the students. We can safely suggest that we will be able to improve medical and nursing students' vocabulary acquisition if we systematically call their attention to that necessity by using, for example, a list or wordbook of basic medical terms throughout their courses. If they are left uneducated in this phase, they are to run a risk of building a tower of medicine without a foundation.

Naturally, the development of medical vocabulary enhances the level of medical English studies and practice of medical and nursing students in the near future. Language starts with and consists of simple words after all.

**Notes:**

(1) Word Frequency Guide (WFG): a corpus whose samples were obtained from 6,333 textbooks, works of literature, and works of fiction and nonfiction used in schools and colleges throughout the United States. It contains 154,941 word types*.

* word types : the number of different words in the Corpus.

e.g. The word "patient" (as in 'a doctor and a patient') and "patient" (as in 'He is a patient man.') represent the same 1 word type.

## REFERENCE

Fujieda, K., Tamamaki, K., Mann, R. (1998). *Medical Terms and Expressions Everybody Uses.* Medical View. Tokyo.

Paribakht, T.S. & Wesche, M.B. (1993). "The relationship between reading comprehension and second language development in a comprehension-based ESL program". *TESL Canada Journal,* 11,9-29.

Schmitt, N.(1998). "Tracking the incremental acquisition of second language vocabulary: a longitudinal study". *Language Learning,* 48:2, 281-317.

Zeno, S.,Ivens, S., Millard, R., Duvvuri, R. (1995). *The Educator's Word Frequency.* Touchstone Applied Science Associates, Inc.

## Appendix A

Medicine-related Words Appearing in High School Textbooks

J.H.S.

body
born
brain
burn
care
catch a cold
clean
cold
cry
damage
dead
death
die
doctor
dream
drink
ear
eat
eye
face
feel
fine
foot
forget
hair
hand
handicapped
head
healthy
hear
hungry
injure
leg
life
listen
mouth
nose
nurse
remember
rest
run
see
sick
sit
sleep
sleepy
smell
smile
speak
stand
tall
think
thirsty
tired
tooth
walk
weak

(57 words)

NewHorizon (for SHS)

ache
affect
alive
ankle
anxiety
arm
asleep
awake
beat
bloodshot eyes
body
bone
born
brain
breath
breathe
cancer
care
dead
death
ear
dentist
depressed
die
doctor
dull
eat
exercise
exhausted
eye
eyesight
face
faint
fat
feel
feel better
feel sick to my stomach
feet
fever
finger
grow
hair
hand
handicapped
headache
health
healthy
hear
heard
heart
hospital
hungry
hurt
ill
illness
influenza
injure
joint
leg
leukemia
lie
life
limp
listen
look
mouth
nerve
nervous
nose
nurse
head
pale
palm
psychological
see
sense
shake
shiver
shoulder
sick
skin
sleep
smile
sore
speak
stomach
stomachache
stress
stressful
stretch
suffer from
symptom
tall
tear
teeth
temperature
thin
think
thirsty
throat
thumb
tired
vision
walk
watch
weak
wheelchair

(107 words)

Genius (for SHS)

AIDS
affect
alive
appetite
arm
asleep
auditory
awake
bandage
bleed
blind
blood
body
born
brain
break
breast
breathe
cancer
cheek
cut finger
deaf
death
dentist
die
disabled
disease
doctor
dream
drug
eat
embryo
eye
face
faint
feel
fertilize
feverish
foot
grow
hair
hand
head
headache
heal
healthy
hunger
hungry
hurt
infection
inject
internal
knee
laboratory test
leg
lie
lip
listen
live
lose
medical
medicine
memorize
memory
microbiologist
nerve
nervous
neurologist
nourishment
organ
pain
pale
physical
prevent
protein
rib
scratch
see
sense
sick
sight
skeleton
skin
sleep
smile
stomach
stomachache
suffer
synapse
tall
tear
teeth
temperature
thermometer
thirsty
tired
tremble
tuberculosis
vitamin
voice
walk
watch
weigh
wheelchair
wrinkle

(105 words)

## Appendix B

The Basic Words for Body Parts
Appearing in High School Textbooks

| J.H.S. | NewHorizon | Genius |
|---|---|---|
| | ankle | |
| | arm | arm |
| body | body | body |
| | bone | |
| brain | brain | brain |
| | | cheek |
| ear | ear | |
| eye | eye | eye |
| | | embryo |
| face | face | face |
| | feet | |
| foot | foot | foot |
| hair | hair | hair |
| hand | hand | hand |
| head | head | head |
| | finger | |
| | joint | |
| | | knee |
| leg | leg | leg |
| | | lip |
| mouth | mouth | |
| | nerve | nerve |
| nose | nose | |
| | | organ |
| | palm | |
| | | rib |
| | shoulder | |
| | | sight |
| | | skeleton |
| | skin | skin |
| | stomach | stomach |
| | tear | tear |
| | teeth | |
| | throat | |
| | thumb | |
| tooth | | |
| (13 words) | (27 words) | (22 words) |